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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,012	01/29/2004	Jay A. Morrison	2003P17581US	4734
7590	04/21/2006		EXAMINER	
Siemens Corporation Intellectual Property Department 170 Wood Avenue South Iselin, NJ 08830			WOLLSCHLAGER, JEFFREY MICHAEL	
			ART UNIT	PAPER NUMBER
			1732	
DATE MAILED: 04/21/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	10/767,012	MORRISON ET AL.	
	Examiner	Art Unit	
	Jeff Wollschlager	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>01/29/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

The abstract of the disclosure is objected to because the abbreviation "CMC" is used without clearly defining that the abbreviation represents the term "Ceramic Matrix Composite". Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 1, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (U.S. Patent 6,350,404; issued February 26, 2002).

Regarding claim 1, Li et al. teach a method for producing a ceramic part with an internal structure, such as a gas turbine blade, comprising the steps: defining a cavity between an inner mold comprising a polystyrene foam insert/fugitive material portion and an outer mold (col. 1, line 67 – col. 2, line 1; col. 2, line 40), casting a layer of ceramic insulating material within the cavity (col. 2, lines 1-3 and lines 27-30), removing the outer mold (col. 2, lines 50-51), and removing the polystyrene foam insert/fugitive material, thus removing the inner mold (col. 2, lines 4 and 52-54).

Li et al. do not teach performing a mechanical process on the layer of ceramic insulating material while the inner mold remains in place for mechanically supporting the layer of ceramic insulating material. However, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the claimed invention to perform a mechanical processing step, such as buffing, grinding, crack filling, etc., after removing the outer mold for the purpose of repairing any surface damage caused during the removal of the outer mold. This would be performed prior to any additional steps, such as removing the inner mold, because this method would obviously reduce the risk of further damage to the surface while providing additional structural support for the work being performed.

It is noted that the fugitive material portion of the mold as taught by Li et al. forms the entire inner mold.

As to claim 6, Li et al. teach the inner mold defines a desired net shape (col. 3, lines 14-16).

As to claim 7, the method taught by Li et al. for forming a product with an internal structure, inherently at least partially cures the layer of ceramic insulating material prior to removing the inner mold.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al., as applied to claim 1, and further in view of Owen et al. (U.S. Patent 5,881,775; issued March 16, 1999).

Li et al. teach the method of claim 1 as discussed in the 103(a) rejection above, but, regarding claim 2, do not teach applying a layer of ceramic matrix composite material to the layer of ceramic insulating material prior to the step of removing the fugitive material and the inner mold. However Owen et al. teach a method of forming a fiber ceramic composite/ ceramic matrix composite to a layer of ceramic insulating material (Figure 1, elements (4) and (6)). Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art to modify the method taught by Li et al. of forming a ceramic structure with the method taught by Owen et al. of forming a ceramic structure with an fiber ceramic composite/ceramic matrix composite for the purpose of creating a stronger and safer product, as described by Owen et al. (col. 1, lines 62-67; col. 2, lines 21-23). Therefore, the claimed invention as a whole is rendered obvious over the combined teaching of the prior art.

As to claim 3, Li et al. further teach performing a mechanical process on an inside surface of the layer of ceramic insulating material after removing the inner mold (col. 3, lines 14-18).

Claims 1 - 7 are rejected under 35 U.S.C. 103(a) as being obvious over Li et al. (U.S. Patent 6,350,404; issued February 26, 2002) in view of Morrison et al. (U.S. Patent Application Publication 2004/0214051; priority date April 25, 2003).

The applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Regarding claim 1, Li et al. teach a method for producing a ceramic part with an internal structure, such as a gas turbine blade, comprising the steps: defining a cavity between an inner mold comprising a polystyrene foam insert/fugitive material portion and an outer mold (col. 1, line 67 – col. 2, line 1; col. 2, line 40), casting a layer of ceramic insulating material within the cavity (col. 2, lines 1-3 and lines 27-30), removing the outer mold (col. 2, lines 50-51), and removing the polystyrene foam insert/fugitive material, thus removing the inner mold (col. 2, lines 4 and 52-54).

Li et al. do not teach performing a mechanical process on the layer of ceramic insulating material while the inner mold remains in place for mechanically supporting the layer of ceramic insulating material. However, Morrison et al. teach a method for forming an analogous ceramic structure where they machine, grind, or sand the outer surface of the ceramic while utilizing the inner mold, comprising a fugitive material, as a mechanical support (paragraph [0019]). Therefore, it would have been prima facie obvious to one of ordinary skill in the art to modify the method of Li et al. with the method of Morrison et al. because the method of Morrison et al. provides a procedure for creating a desired surface profile in the formed product (paragraph [0019]). This would motivate an artisan by providing additional production flexibility. Further, Morrison et al. teach that, in general, it is common in the art to perform this type of mechanical process in the formation of ceramic insulating layers from a casting method (paragraphs [0006] and [0007]).

Li et al. teach the method of claim 1 as discussed above, but, regarding claim 2, Li et al. do not teach applying a layer of ceramic matrix composite to the layer of ceramic insulating material prior to the step of removing the fugitive material and removing the inner mold. However, Morrison et al. teach applying a ceramic matrix composite material to the layer of ceramic insulating material (paragraphs [0006], [0020]). Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art to modify the method taught by Li et al. of forming a ceramic structure with the method taught by Morrison et al. of forming a ceramic structure with an fiber ceramic composite/ceramic matrix composite for the purpose of creating a stronger product as described by Morrison et al. (paragraph [0002]) Therefore, the claimed invention as a whole is rendered obvious over the combined teaching of the prior art.

As to claim 3, Li et al. further teach performing a mechanical process on an inside surface of the layer of ceramic insulating material after removing the inner mold (col. 3, lines 14-18).

As to claims 4 and 5, Li et al. teach the method of claim 1 as discussed in the 103(a) rejection above, but do not teach the mechanical process comprises machining the layer to a predetermined thickness. However, Morrison et al. teach the mechanical process comprises machining the layer to a predetermined thickness/desired surface profile (paragraphs [0019], [0006], [0007]). Therefore it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the claimed invention to take the method of Li et al. and modify it with the method of Morrison et al. because Morrison et al. teach that following the method of casting the product thicker than required and then

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machining the thickness after casting enables the production of large thin shapes that would be difficult or impossible to cast utilizing other means (paragraph [0006]). As such, the invention as a whole is rendered obvious over the combined teaching of the prior art.

As to claim 6, Li et al. teach the inner mold defines a desired net shape (col. 3, lines 14-16).

As to claim 7, the method taught by Li et al. for forming a product with an internal structure, implicitly at least partially cures the layer of ceramic insulating material prior to removing the inner mold

Claims 8-10 are rejected under 35 U.S.C. 103(a) as being obvious over Li et al. (U.S. Patent 6,350,404; issued February 26, 2002) in view of Morrison et al. (U.S. Patent Application Publication 2004/0214051; priority date April 25, 2003) (herein Morrison '051), as applied to claims 1-7 above, and further in view of Morrison et al. (U.S. Patent Application Publication 2005/0076504; filed September 17, 2002) (herein Morrison '504).

The applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed

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subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

Regarding claim 8, Li et al., in view of Morrison '051, teach the method of claim 1 as discussed in the 103(a) rejection above. The combined references, do not teach partially curing the layer of ceramic insulating material prior to removing the inner mold. However, Morrison '504 teaches at least partially curing the layer of ceramic insulating material after the inner mold/mandrel has been removed and installing a second inner mold/mandrel for supporting the ceramic insulating material during a subsequent process step (paragraphs [0021] [0022] [0031]). Morrison '504 does not explicitly state the second inner mold comprises a fugitive material. However, mandrels/inner molds comprising fugitive materials are well known in the art. Therefore, it would have been *prima facie* obvious to modify the method taught by Li et al. in view of Morrison '051 with the method of Morrison '504 because Morrison '504 teaches that it is beneficial to have additional support during the process for forming a material comprising ceramic insulating material (paragraph [0021] [0023]). Therefore, the invention as a whole is rendered obvious over the combined teaching of the prior art.

As to claim 9, Li et al. teach using polystyrene foam as the fugitive material. Morrison '051 teaches that wax, epoxy and glues may be used as fugitive materials (paragraph [0016]). One of ordinary skill in the art would recognize that various fugitive mold materials could be employed.

Li et al. in view of Morrison '051 teach the method of claim 8 as discussed above, but, regarding claim 10, Li et al. in view of Morrison '051 do not teach applying a layer of ceramic matrix composite to the layer of ceramic insulating material after the second mold is installed. However, Morrison '504, teach applying a layer of ceramic matrix composite to the layer of ceramic material after the second inner mold is installed (paragraph [0021]). Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art to modify the method taught by Li et al. of forming a ceramic structure with the method taught by Morrison '504 of applying the layer of ceramic matrix composite to the layer of ceramic insulating material after the second mold is installed because one of ordinary skill would be motivated to provide physical support to the ceramic piece while it underwent further processing to ensure the piece does not break, crack, or shatter. Therefore, the claimed invention as a whole is rendered obvious over the combined teaching of the prior art.

Claims 11-18 are rejected under 35 U.S.C. 103(a) as being obvious over Li et al. (U.S. Patent 6,350,404; issued February 26, 2002) in view of Morrison et al. (U.S. Patent Application Publication 2004/0214051; priority date April 25, 2003) (herein Morrison '051), as applied to claims 1-7 above, and further in view of Morrison et al.

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(U.S. Patent Application Publication 2005/0076504; filed September 17, 2002) (herein Morrison '504).

The applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

Regarding claim 11, Li et al. teach a method of manufacturing a gas turbine component (col. 1, line 7), the method comprising defining a cavity between an inner mold comprising a polystyrene foam insert/fugitive material portion and an outer mold (col. 1, line 67 – col. 2, line 1; col. 2, line 40), casting a layer of ceramic insulating material within the cavity (col. 2, lines 1-3 and lines 27-30), removing the outer mold

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(col. 2, lines 50-51), and removing the polystyrene foam insert/fugitive material, thus removing the inner mold (col. 2, lines 4 and 52-54).

Li et al. do not teach removing a portion of the ceramic insulating material to reduce the thickness while the inner mold remains in place and forming a layer of ceramic matrix composite material on an outer surface of the ceramic insulating material. However, Morrison '051 teach removing a portion of the ceramic insulating material to reduce the thickness while the inner mold remains in place (paragraphs [0019], [0006], [0007]) Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art to combine the teachings of Li et al. with Morrison '051 because Morrison '051 provides a procedure for creating a desired surface profile in the formed product (paragraph [0019]). This would motivate an artisan by providing additional production flexibility.

Further, Morrison '504 teach applying a layer of ceramic matrix composite to the layer of ceramic material with an inner core installed. Therefore, it would have been *prima facie* obvious to one of ordinary skill in the art to modify the teachings of Li et al. in view of Morrison '051 with the method of Morrison '504 for the purpose of providing a better insulating material (paragraph [0020]) than a ceramic matrix composite alone. Therefore the claimed invention as a whole is rendered obvious over the combined teaching of the prior art.

As to claim 12, Li et al. transform the fugitive material prior to removing it by dissolving it (col. 2, lines 1-4).

As to claim 13, it is an implicit property of the method taught by Li et al. to at least partially cure the ceramic insulating material while the inner mold remains in place prior to the step of removing a portion of the ceramic insulating material.

Li et al. in view of Morrison '051 and further in view of Morrison '504 teach the method of claim 11, as discussed above. Further, regarding claim 14, Morrison '504 teaches at least partially curing the layer of ceramic insulating material after the inner mold/mandrel has been removed and installing a second inner mold/mandrel for supporting the ceramic insulating material during a subsequent process step (paragraphs [0021] [0022] [0031]). Therefore it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the claimed invention to modify the teachings of Li et al. with the method of Morrison '504 because one of ordinary skill would be motivated to support the ceramic insulating material during further processing to keep it from cracking, breaking or shattering. Therefore the claimed invention as a whole is rendered obvious over the combined teaching of the prior art

As to claim 15, Li et al. teach using polystyrene foam as the fugitive material for an inner mold and Morrison '051 teaches that wax, epoxy and glues may be used as fugitive materials for an inner mold (paragraph [0016]). One of ordinary skill in the art would recognize that various fugitive mold materials could be employed.

As to claims 16 and 17, Li et al. teach performing a mechanical step on an inside surface of the ceramic insulating material after the step of removing the inner mold and forming the inner mold to have a net shape desired for the passageway (col. 3, lines 14-18).

Li et al. in view of Morrison '051 and further in view of Morrison '504 teach the method of claim 11, above. Further, regarding claim 18, Morrison '051 teach casting the ceramic insulating layer to a thickness 5-10 times thicker than the grain size of the ceramic material (i.e. at least 15 mm) [paragraph 0006]) and removing a sufficient portion of the ceramic insulating material to a thickness of 5-8 mm (paragraph [0007]). Therefore it would have been prima facie obvious to one of ordinary skill in the art at the time of the claimed invention to modify the method of Li et al. with the method of Morrison '051 because, as taught by Morrison '051 following the method of casting the product thicker than required and then machining the thickness after casting enables the production of large thin shapes that would be difficult or impossible to cast utilizing other means (paragraph [0006]). As such, the invention as a whole is rendered obvious over the combined teaching of the prior art.

Conclusion

All claims are rejected.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Wollschlager whose telephone number is 571-272-8937. The examiner can normally be reached on Monday - Thursday 7:00 - 4:45, alternating Fridays.

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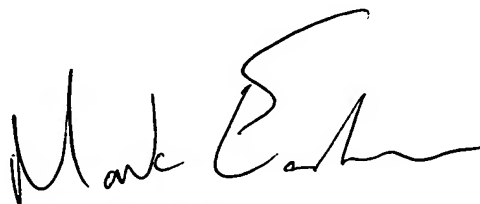
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Colaianni can be reached on 571-272-1196. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JW

Jeff Wollschlager
Examiner
Art Unit 1732

April 14, 2006



MARK EASHOO, PH.D
PRIMARY EXAMINER

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